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Using Evidence-Based Guidelines to Evaluate Research Support for the Use of Social Stories with Children with Autism

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USING EVIDENCE-BASED GUIDELINES TO EVALUATE RESEARCH SUPPORT FOR THE USE OF SOCIAL STORIES WITH CHILDREN WITH AUTISM

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Social Stories have gained wide acceptance and popularity as an intervention for children with autism and autism spectrum disorders, yet it is unclear whether this intervention method meets the standards of an evidence-based intervention. With a push in educational and mental health fields to use only evidence-based interventions, there is a need to determine whether or not this popular method meets this standard. The research literature on Social Stories has been reviewed for this project. An analysis of each article was conducted to evaluate clinical utility and treatment efficacy. Using the clinical utility and treatment efficacy information, as well as additional criteria, each article was evaluated to determine if it met the criteria deemed necessary by the No Child Left Behind Act (NCLB) for evidence-based research. Based on the findings gathered from the analysis of the studies, only three of the 18 studies (16.7%) meet all NCLB criteria for evidence-based research. Because such a small percentage of the studies reviewed met all criteria, Social Stories cannot yet be considered an evidence-based intervention for children with autism.

Introduction

Autism Spectrum Disorders (ASD) is a broad term used to include a variety of disorders such as Autism, Asperger's Syndrome, Childhood Disintegrative Disorder and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) (Crozier & Sileo, 2005). The numbers of ASD diagnoses are on the rise. The American Psychiatric Association (2000) had estimated that one in every 2000 children was diagnosed with autism. However, the Center for Disease Control and Prevention (CDC, 2007) recently concluded that the prevalence of ASD was at 1:150 births. Autism is generally characterized by impairments in social interactions, communication, and behavioral repertoires. The actual behaviors shown and the severity of impairments in each of those areas can vary greatly. Due partly to the variety of characteristics and impairments, there is no clear cut way to diagnose autism and ASD. Medical or educational criteria are two methods by which to diagnosis ASD.

The United States Department of Education's (2006) criteria for an educational classification of autism include that the child exhibits significant deficits in verbal and nonverbal communication, and social interaction, which are generally evident before the age of three and that these deficits adversely affect the child's educational performance but are not due to an emotional disability. Other characteristics of autism within these diagnostic criteria include repetitive activities, stereotyped movements, resistance to environmental change or change in daily routines and unusual responses to sensory stimuli. This educational diagnosis does not discuss or differentiate other autism spectrum disorders from autism.

The medical diagnosis of autism follows the *Diagnostic and Statistical Manual for Mental Disorders- Text Revision IV* (DSM-IV-TR, American Psychiatric Association, 2000) criteria. This diagnostic criteria states that (a) there must be evidence of at least two qualitative impairments in social interactions, (b) evidence of at least one qualitative impairment in communication, (c) evidence of at least one restricted repetitive and stereotyped pattern of behavior, interest or activity, (d) the onset of delays or abnormal functioning in language, social interaction or symbolic or imaginative play must occur prior to the age of three, and (e) that Rett's Disorder or Childhood Disintegrative Disorder must be ruled-out. The DSM-IV-TR provides different diagnosis criteria for Asperger's Disorder, PDD-NOS, Childhood Disintegrative Disorder and Rett's Disorder. Asperger's Disorder is differentiated from autism by the lack of delay in early language development and as long as the criteria are not met for autism. A diagnosis of PDD-NOS may be given when there are pervasive and severe impairments in the development of reciprocal social interaction but the criteria are not met for a specific Pervasive Developmental Disorder, such as autism or Asperger's Disorder (APA, 2000).

Children within the autism spectrum experience great difficulty with language and communication. According to APA (2000), nearly 50% remain mute throughout their lives. Those who do acquire speech often experience delays and deviations in their development of language. Symptoms of these delays and deviations include echolalia, abnormal prosody, pragmatic and semantic deficits, pronoun reversals and comprehension difficulties.

According to APA (2000), autism is also characterized by restrictive, repetitive and stereotypic behaviors. Individuals may show evidence of preoccupation with and an

unusual interest in certain things, such as vacuum cleaners or satellite dishes. They may also exhibit repetitive behaviors such as watching the same movie over and over, or lining objects in a row. Individuals with ASD are extremely routine oriented and may have difficulty adjusting to changes in food, schedules and transitions between activities. Also characteristic of autism are stereotypic behaviors such as hand flapping, toe walking and finger mannerisms. Many individuals have one or more of their senses that are hypo-(under) or hyper-(over) sensitive. Such sensitivity difficulties might be exhibited through behaviors such as putting their hands over their ears, having little sensation for pain, or excessive muscle tone and force.

One of the most characteristic symptoms, as well as problematic traits, for those with ASD is a dysfunction in social behavior. Edelson (1997) classifies the dysfunctions in social behavior into three categories: (a) socially avoidant, (b) socially indifferent, and (c) socially awkward. Socially avoidant behaviors are typically expressed as tantrums, covering ears, arching of the back when touched, or running away from someone who is trying to interact with the individual. Socially indifferent individuals do not seek social interaction with others for pleasure but rather out of need of something. These individuals do not necessarily avoid social situations and may not seem to mind being around others, but rather are indifferent as to whether or not they are alone or with others. Socially awkward describes individuals with ASD who have trouble making and maintaining friendships, even though there may be a desire to interact with others. This category is commonly seen in those with Asperger's Syndrome. Because of the deficits in social functioning, individuals with ASD may ignore or misinterpret social cues and, as a result, respond in ways that are considered inappropriate. The behavior problems

that arise from these misinterpreted cues can create great strife within the home, community and school settings.

This literature review will briefly discuss definitions of evidence-based practices and review the empirical support for commonly used interventions for children with ASD. The emphasis of this specialist project is to examine the empirical evidence for Social Stories, an increasingly used intervention for children with ASD. Studies examining the effectiveness of Social Stories typically use a very small number of participants and the results have been inconsistent. A thorough review of all the available Social Stories research studies will be conducted to determine whether this intervention designed specifically for children with autism meets the guidelines for evidence-based interventions as set forth by governmental and professional agencies' standards. Characteristics of individual participants in the research studies as well as defining aspects of the research designs will be delineated to evaluate how and why Social Stories may be effective for some individuals and not for others. As of a few years ago, the National Research Council (2001) stated, "the effectiveness of this technique [Social Stories] with young children has not yet been established" (pp. 78-79). This research project is needed to determine if Social Stories can now be considered an evidence-based intervention and what future research directions may be needed to evaluate the utility of the intervention.

Literature Review

The diagnosis of ASD had increased greatly over the past several years (CDC, 2007). It is unknown whether the increase in diagnoses is primarily due to more awareness of ASD and broader classification criteria or due to unidentified environmental factors. As such, the rapid rise in prevalence rates has become quite controversial (National Research Council, 2001). Regardless of whether or not ASD has reached "epidemic" proportions, it is clear school systems have many more children with ASD to educate. Effective interventions are needed for children with ASD and the government has mandated that these interventions be evidence-based.

Evidence-Based Practices

Within the literature, the terms evidence-based, research-based, and scientifically based are used interchangeably with no discernable difference between the three terms. These three terms will be used within this section as they were used within the body of literature they come from, but for the purposes of the research conducted with this paper, the term evidence-based will be used.

There is currently no clearly defined or universally accepted definition of evidence-based practice. Indeed, there are many definitions offered. The American Psychological Association (APA, 2005) presented a document titled, *Report of the 2005 Presidential Task Force on Evidence-Based Practice*. In this report, it was concluded that "evidence-based practice in psychology is the integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preferences" (p. 17). Hoagwood and Johnson (2003) defined evidence-based practice as such:

> The term "evidence-based practice" (EBP) refers to a body of scientific knowledge, defined usually by reference to research methods or designs, about a range of service practices (e.g., referral, assessment, case management, therapies, or support services)… The knowledge base is usually generated through application of particular inclusions criteria (e.g., type of design, types of outcome assessments) and it generally describes the impact of particular service practices on child, adolescent, or family outcomes. "Evidence-based practice" or EBP is a shorthand term denoting the quality, robustness, or validity of scientific evidence as it is brought to bear on these issues. (p. 5)

Cournoyer and Powers (as cited within Kratochwill & Shernoff, 2004) provided the following definition of evidence-based practice:

> Evidence-based practice…dictates that professional judgments and behavior should be guided by two distinct but interdependent principles. First, whenever possible, practice should be grounded on prior findings that demonstrate empirically that certain actions performed with a particular type of client or client system are likely to produce predictable, beneficial, and effective results… Secondly, every client system, over time, should be individually evaluated to determine the extent to which the predicted results have been attained as a direct consequence of the practitioner's actions. (p. 36)

What constitutes an evidence-based, research-based or scientifically based method in education is not easily discerned, but there are several committees which are working to clarify these terms. One such committee is the Task Force on Evidence-Based Interventions in School Psychology. This task force was founded in 1999 and

supported by both the Division of School Psychology of the American Psychological Association and the Society for the Study of School Psychology. This task force was founded on the premise that if school psychologists are to be scientist-practitioners there must be scientific standards upon which practice is based (Gutkin, 2002).

What Works Clearinghouse (WWC, 2006) has developed a guideline of evidence standards for reviewing research studies? The WWC stated that they complete three steps in order to determine whether an intervention is deemed evidence-based. The first step is one in which the intervention is screened based on the relevance to a particular topic area, the quality of the outcome measures and the adequacy of data reported. If the intervention passes one or more of these areas, it is taken to the next stage of screening. The second stage assesses the strength of the evidence that a study provides for the effectiveness of the intervention. In order to meet these evidence standards, an intervention study has to be a randomized controlled trial or a quasi-experiment with one of the following designs: quasi-experiment with equating, regression discontinuity design, or single-case design. If the intervention passes this stage, it is given the title of *Meets Evidence Standards* or *Meets Evidence Standards with Reservations*. Interventions that do not provide sufficient evidence of effectiveness are labeled as *Does Not Meet Evidence Standards*. Once the intervention study passes the second stage it moves to the final stage, in which contextual information about the studies are reviewed. This contextual information includes the following: variations in people, settings, and outcomes; analysis of intervention's effects on different subgroups, settings and outcomes; and statistical reporting. This last stage does not affect the title in which it was

given in the second stage; it is rather a review of the studies to assure further a consistent interpretation of the findings and to allow for comparisons of the findings across studies.

For this paper, and the subsequent analysis of the Social Stories research, the definition from the No Child Left Behind Act of 2001 (which is the reauthorization of the Elementary and Secondary Education Act) will be used to evaluate studies using Social Stories as an intervention method. The definition of scientifically based research in section 9101(37) of the Elementary and Secondary Education Act (U.S. Department of Education, 2007) reads as follows:

> Scientifically based research (a) Means research that involves the application of rigorous, systematic, and objective procedures to obtain reliable and valid knowledge relevant to education activities and programs; and (b) Includes research that (1) Employs systematic, empirical methods that draw on observation or experiment; (2) Involves rigorous data analyses that are adequate to test the stated hypotheses and justify the general conclusions drawn; (3) Relies on measurements or observational methods that provide reliable and valid data across evaluators and observers, across multiple measurements and observations, and across studies by the same or different investigators; (4) Is evaluated using experimental or quasi-experimental designs in which individuals, entities, programs, or activities are assigned to different conditions and with appropriate controls to evaluate the effects of the condition of interest, with a preference for random-assignment experiments, or other designs to the extent that those designs contain within-condition controls; (5) Ensures that experimental studies are presented in sufficient detail and clarity to allow for replication or, at a minimum,

offer the opportunity to build systematically on their findings; and (6) Has been accepted by a peer-reviewed journal or approved by a panel of independent experts through a comparably rigorous, objective, and scientific review. (p. 1)

Common Interventions for ASD

Although there is currently no cure for ASD, there are many recommended treatment and intervention methods specifically designed for children with ASD. These interventions have been implemented in hopes of improving the day-to-day functioning of individuals with ASD, in particular communication and social functioning. Interventions differ in many ways, including who implements them, how often they are implemented, and the age and severity level of the individual with ASD (Rogers, 2000).

No one intervention or treatment is likely to work with all individuals with ASD due to the vast differences in characteristics and behaviors of each person across the autism spectrum, but some interventions have been promoted as useful for those with ASD and appear to be more commonly used in the field. Commonly used, however, does not necessarily mean empirically supported. Common interventions for children with ASD include methods such as the Picture Exchange Communication System, music therapy, sensory integration training, Discrete Trial Training, Treatment and Education of Autistic and related Communication-Handicapped Children (TEACCH), and video modeling. A brief review of the empirical support for these methods was conducted.

Picture Exchange Communication System. Picture Exchange Communication System (PECS, Bondy & Frost, 1994) is an augmentative communication system widely used to address communication deficits in those with ASD and other related disabilities. It is a pictorial system that uses basic behavioral principles and techniques to teach

functional communication. The pictures are generally kept by the child on a board attached by Velcro (Charlop-Christy, Carpenter, Le, LeBlanc, & Kellet, 2002). The child is taught to communicate by using the picture symbols to create a "sentence" to express desire and preference for activities and tangibles. There are few independently published experimental studies that specifically address issues of efficacy of PECS (Ganz & Simpson, 2004).

Bondy and Frost (1994) describe a case study of a three-year-old boy diagnosed with autism who was exhibiting many stereotypic characteristics of autism (lack of interest in social interactions, ritualistic play, lack of speech, fleeting eye contact, etc.). Within four months of being trained to use the PECS system, the young boy was using intelligible speech while moving the pictures on the PECS board. After 11 months, he was using only speech to communicate.

Bondy and Frost (1994) also described a long term study conducted over five years following 85 children, who at the beginning of the study were 5 years old or younger and who were taught to communicate with PECS. Each of those children entered into the training without previous functional speech or alternative communication systems. Seventy-six percent of the children in this study were able to use speech either as their sole communication method or augmented with a picture-based system at the end of the five-year study. The authors concluded that PECS is helpful with very young children who display significant communication deficits.

Ganz and Simpson (2004) examined the effects of PECS in increasing the number of spoken words and the complexity and length of phrases as well as decreasing non-word vocalizations of three children with ASD. The children were between the ages of

three and seven years. All were diagnosed with ASD and developmental delays. Each participant was identified as having little to no functional speech. The single subject study was conducted in the elementary classroom of each participant. PECS training sessions were conducted two to five times per week, with 15 trials per session. Results of the study indicated that all three participants made progress with the mastery of PECS. There was a decrease in percentage of non-word vocalizations between phase one and phase four, the last phase. The participants also exhibited increases in the average number of intelligible words spoken per trial, ranging from no words in phase one to five words in the last phase. It was also found that the participants generalized their skills to a variety of adults.

Charlop-Christy et al. (2002) conducted a study using a multiple baseline design to examine the acquisition of PECS as well as the emergence of speech during play and academic settings with three children diagnosed with autism. All boys were reported to lack spoken language or rarely speak. The three boys, aged 3 years to 12 years, participated in the study at an after-school behavioral treatment program. PECS training sessions were conducted twice a week for 15 minutes. To examine long-term effects, a follow up was conducted approximately 10 months after the study. Results showed that all three children mastered the use of PECS in a relatively short amount of time. It was also demonstrated that all three children showed an emergence of speech, gains in social-communicative behaviors and decreases in problem behavior. During the follow-up period, it was shown that spontaneous speech and imitation were maintained.

Kravits, Kamps, Kemmerer and Potucek (2002) conducted a study examining the effects of PECS on the spontaneous communication skills and the social interaction of a

6-year-old girl with autism. A multiple baseline design across settings, which included two baseline conditions and two treatment phases, was used to examine treatment effectiveness. Results indicated gains in spontaneous language across settings. Verbalizations also increased in two of the three settings and social interaction increased in one of the two school settings for the young girl.

Schwartz and Garfinkle (1998) conducted two studies to examine the use of PECS as a method for teaching functional communication skills to young children with severe communication delays. In the first study, 31 young children, aged 3 to 6 years, participated in the study. Sixteen of these children had been diagnosed with autism or Pervasive Developmental Disorder-Not Otherwise Specified. The study was designed to examine the rate of acquisition of PECS. All interventions took place in the children's classrooms. Results indicated that all 31 children learned to use the PECS system to communicate in a functional manner with others, on an average of 14 months after beginning the PECS training.

The second study conducted by Schwartz and Garfinkle (1998) consisted of 18 preschool children with significant disabilities. They were a subset of the children who participated in the first study. This study examined the effects of PECS on overall communication, including spoken language, and multiple communicative forms. Data were collected during snack and free-choice time in the preschool classroom, approximately 45 minutes each day. The study was conducted over a 12-month period, across two school years. Results indicated that 44% of the participants acquired unprompted, non-echolalic spoken communication. Results also showed that the children were able to use the PECS system across settings.

Yoder and Stone (2006) conducted a randomized group experiment that compared the efficacy of Responsive Education and Prelinguistic Milieu Teaching (RMPT) and the PECS on the spoken communication of 36 preschoolers with ASD. The children were randomly divided into two groups, one that received RPMT and the other PECS. Each treatment was delivered to the respective groups of children for a maximum of 24 hours over a 6-month period. Spoken language was measured pretreatment, post-treatment and during a 6-month follow-up period. This study also looked at pretreatment object exploration, a measure of interest in a variety of objects as a predictor of differential responses to treatment conditions. The results of growth over all three measurement periods indicated that the number of nonimitative words were acquired faster in the PECS group than in the RPMT group who began treatment with relatively high object exploration. However, those in the RPMT group who began treatment with relatively low object exploration acquired nonimitative words faster than those participants in the PECS group.

Based on the available research, PECS has generally been shown to be an intervention method that is easily learned by ASD individuals and is effective in increasing spontaneous speech and communication skills. Although more research should be conducted to explore further the effectiveness of PECS, conclusions can be drawn from the existing body of research that PECS is an evidence-based intervention.

Music therapy. Music therapy can be defined as the application of music to promote development in learning, communication, social and emotional areas. The use of music is thought to be effective because of its intrinsic and immediate reinforcing nature. Using preferred music for children with autism can be used as a means of a

reward or, with the use of headphones, it may be used to calm the child by blocking out loud or disturbing auditory stimuli.

According to the Center for the Study of Autism's (2007) website, music therapy sessions can be designed to support the objectives and goals that other professionals have created for the child with autism. Music can be used to facilitate social interactions as well as eye contact and speech development. Yet, few empirical studies have examined the effectiveness of music therapy in the treatment of autism (Dempsey & Foreman, 2001). In Dempsey and Foreman's (2001) article reviewing various intervention methods for autism, the authors cite only a couple of articles that suggested music therapy may be useful in addressing specific characteristics of autism such as language, emotional, cognitive, and motor impairments but no description of actual research characteristics or methods were given.

Duffy and Fuller (2000) investigated the effectiveness of a music therapy program on the acquisition of social skills of children with a moderate intellectual disability. Thirty-two children, ages 5-10 years, participated from four intellectual disability centers. Four children from each center were randomly placed in the music therapy program and four children were placed in a non-music control group program. Five social skills were targeted: turn-taking, imitation, vocalization, initiation, and eye contact. Measures of effectiveness were conducted using pre- and post-intervention scores of the five target skills using a social skills test specifically designed for the study. The results indicated improvement in the five target social skills for children in both experimental and control conditions. Music therapy did not result in greater gains.

Wimpory, Chadwick, and Nash (1995) presented a case study that explored the effects of Musical Interaction Therapy (MIT) on the social and symbolic development of a three-year-old child with autism. MIT is based on factors that facilitate normal preverbal interaction as a means to developing interpersonal contact, joint attention, and understanding. The mother of the child and the musician conducted twice-weekly 20-minute MIT sessions at home during the intervention phase. The study followed a single subject AB design, consisting of a 4-month baseline, 7-months of MIT, and follow-up 20-months later. Results indicated that MIT improved the child's use of social acknowledgment, eye contact, and initiations of interactive involvement. The follow-up concluded that these positive changes were sustained and the child no longer showed frequent social withdrawal.

Because such little research is available on music therapy as an intervention technique for children with autism, little can be concluded about the effectiveness of the intervention. Based on the research that has been reviewed for this paper, a single subject design study suggested music therapy was effective in increasing certain behaviors. However, the research design used in that study did not demonstrate with certainty that a functional relationship existed between the behavioral improvements and the intervention. Limited research studies and the results of an experimental evaluation of music therapy (i.e., Duffy & Fuller, 2000) do not support music therapy as an evidenced-based strategy.

Sensory integration training. Sensory integration therapy or training is based on the theoretical work of A. J. Ayres from the 1970s. It emphasizes the relationship between sensory experiences and motor and behavioral performance (Dawson &

Watling, 2000). Sensory integration training is thought to be helpful because the brain of the child with autism does not correctly register sensory input. At times, individuals with ASD seem to pay little to no attention to sensory stimuli while at other times they may seem to overreact (Ramirez, 1998). Ritualistic and repetitive behaviors have been thought to be attempts by the individual with ASD to moderate the level of sensory input they receive. Activities of sensory integration are child-directed and emphasize the production of functional and adaptive responses to sensory stimuli. The training is typically conducted by a trained occupational therapist and includes activities such as swinging, deep pressure touch, balance activities, and tactile stimulation (Dawson & Watling, 2000; Dempsey & Foreman, 2001).

Dawson and Watling (2000) reviewed evidence of the effectiveness of sensory integration therapy in four objective outcome studies. Although the findings of all four studies showed positive results in the use of sensory integration therapy, the authors concluded that because the studies were of such small scale, decisions of efficacy could not be made. Dempsey and Foreman (2001) addressed similar results in their article, which reviewed educational approaches for individuals with autism. In the article they cited examples of sensory integration studies that they deemed well controlled in which the intervention was found to be either ineffective or no more effective than other methods.

Baranek (2002) wrote a review paper that summarized the sensory and motor difficulties often found within autism and evaluated the scientific basis of various sensory and motor interventions used with this population. Baranek reviewed 29 empirical studies that used sensory integration techniques for children with autism spectrum

disorders. It was concluded that some of the treatment techniques reviewed provided little rationale for their use with children with autism and have no empirical evidence to support their efficacy with this population. The author suggested that many of the studies that at best have modest outcomes are limited by methodological constraints and issues of generalizability. Another concern noted was that most of the studies reviewed had limited follow-up data so it was not known whether any effects were maintained. Baranek believes that the biggest limiting factor is that many studies fail to link changes in the dysfunction (e.g., auditory sensitivity and vestibular dysfunction) to functional changes in behavior. The author cautions at the end of the article that although there is a lack of empirical data, it does not directly infer that the treatment method is ineffective but rather the efficacy has yet to be objectively demonstrated.

Based on current research of sensory integration techniques, there is little evidence to support it as an evidence-based intervention technique for children with autism. Until research is conducted which provides evidence of effectiveness for this method, professionals should exhibit caution if implementing this technique.

Discrete Trial Training. Discrete Trial Training (DTT) is a procedure based on the applied behavior analytic approach, which uses repetition and sequenced instruction (Weiss, 2005). It is an intensive approach using drills of selective materials. Behaviors are prompted and children receive reinforcement for proper responses. As the child progresses, more advanced skills are added and easier skills are rehearsed less frequently. A discrete trial consists of a cue (e.g., "show me the yellow marker"), the response from the child (prompting the correct response if the child responds incorrectly), and reinforcement of a correct response (Smith, 2001).

The DTT approach originated from Ivar Lovaas of the UCLA Young Autism Project (Lovaas, 1987; National Autistic Society, 2007). Lovaas' (1987) original research consisted of intensive one-on-one intervention by a trained therapist for 40 hours a week, with a focus on reducing unwanted behaviors and increasing communication and language skills. The results of this longitudinal study revealed that of nineteen participants with autism, 47% achieved normal intellectual and educational functioning after intensive discrete trial training therapy, another 40% were considered to be mildly mentally disabled and were assigned to classes for the language delayed, and only 10% were profoundly mentally disabled and assigned to intensive self-contained classrooms. In contrast, only 2% of the control group children were classified as achieving normal educational and intellectual functioning, 45% were labeled as mildly mentally disabled, and 53% were severely mentally disabled (Lovaas, 1987). This behavioral approach is sometimes known as the Lovaas method and the teaching techniques as DTT.

Din and McLaughlin (2000) investigated whether the DTT approach was effective in teaching four young children with autism functional and pre-academic skills. The four boys aged 3 to 4 years were provided with DTT for seven months to one year for about an hour a day, 4 to 5 days per week. Each child was taught to follow directions, identify objects, body parts and action verbs, recognize functional vocabulary, and speak words and simple sentences. The results indicated that all four of the boys learned various functional and pre-academic skills through discrete trial training. Two of the boys learned to speak simple words and sentences.

Smith (2001) cautions against the use of DTT methods due to several limitations. The first of such limitations is that in DTT the child is responding to cues from the

teacher and consequently the child may not learn to initiate these behaviors on his/her own in the absence of definite cues. Additionally, DTT requires a tightly controlled learning environment that may create a situation in which the child is unable to transfer skills to other settings. DTT is also time and labor intensive. Teachers must work one on one with a child and continually provide cues throughout the therapy session. This leads into the last limitation mentioned in Smith's article, the controversy over the length of DTT session duration needed to be effective. There is much debate over whether intensive DTT, 15 – 40 hours per week for two or more years, is appropriate for young children with autism.

Delprato (2001) reviewed 10 studies in which comparisons were made between DTT procedures and "normalized" interventions for teaching language to children with autism. Normalized interventions differ from DTT methods in the following ways: (a) sessions are loosely structured and paced by the child, (b) instruction is indirect and takes places in various settings, (c) antecedent stimuli are selected by the child, (d) there is no particular order for target responses within a session, (e) prompt strategies vary, (f) reinforcers are functionally related to target responses and vary across sessions, and (g) attempts at responses are positively reinforced and are not based on correct responses. The conclusion from the review of the 10 studies showed that "differences convincingly favored normalized treatment" (p. 323). In two studies that measured parental affect, normalized treatment was again favored. The author concludes from this review that normalized teaching is superior to discrete trial training in teaching children with autism.

DTT is a popular intervention method and there does seem to be evidence to support such a method as evidence-based. However, it seems from the literature that the maintenance and the generalization of this intervention are still questionable.

Treatment and Education of Autistic and related Communication-Handicapped Children (TEACCH). The TEACCH approach was developed by Mesibov, Schopler and colleagues at the University of North Carolina (Mesibov, 2006). In 1972, it became the first comprehensive state-wide community-based service program for children and adults with autism. The approach draws on behavioral techniques to teach self-care skills and manage behavior, with a focus on developing communication skills (Dempsey & Foreman, 2001; Tutt, Powell, & Thorton, 2006). TEACCH focuses on individualization, structured learning and environmental adaptation using such strategies as daily schedules and visual cues (Dempsey & Foreman, 2001). It also incorporates family services and parent training as part of the intervention strategy.

The TEACCH program can be adapted for classroom use. This adaptation is called structured teaching. Structured teaching is composed of three components: physical organization, schedules, and task organization (Division TEACCH, 2006). The physical organization component is concerned with the actual physical layout of the classroom to ensure there are specific areas for certain tasks. The schedule provides a daily visual framework for both the individual student and the class as a whole. The task organization component requires that tasks be organized in a systematic manner, such that performance of certain tasks always follows a particular sequence or order.

Tsang, Shek, Lam, Tang and Cheung (2006) conducted a longitudinal study to evaluate the effectiveness of the TEACCH program for 34 Chinese preschool children

with autism. The study was conducted over one year during which all participants were assessed pretest and posttest using the Developmental Scale of the validated Chinese version of the Psycho-Educational Profile-Revised (PEP-R), the Merrill-Palmer Scale of Mental Test (MP) and the Hong Kong Based Adaptive Behavioral Scales (HKBABS). For 12 months, all the children in the experimental group received seven hours of TEACCH training a day. To examine the effects of TEACCH on the experimental group, repeated measures analyses of variance were performed at pretest, posttest one, and posttest two. Results of the study indicated that the experimental group showed gains in imitation, perception, fine motor, eye-hand coordination, and gross motor skills, as well as cognitive functioning. The authors concluded that there is empirical evidence supporting the use of TEACCH with Chinese children diagnosed with autism.

Panerai, Ferrante, and Zingale (2002) compared TEACCH with an integration program for individuals with disabilities. The integration program is a classic Italian approach for integrating children with disabilities into regular education classroom with support teachers. The authors hypothesized that the TEACCH program might be more successful than the integration approach because it specifically addresses those students with autism. Sixteen children with autism were divided into two groups (experimental and control) based on chronological age, mental age, and Childhood Autism Rating Scale score. The TEACCH program was applied to the experimental group and the control group was integrated in regular schools. The Psycho-Educational Profile-Revised (PEP-R) and the Vineland Adaptive Behavior Scale were administered twice, with a year between administrations. A statistically significant improvement was found in the PEP-R scores of the experimental group in all categories except fine motor skills. Analysis of

the Vineland Adaptive Behavior Scales did not show statistically significant improvements in communication and interpersonal relationships from the pre-test administration of the same adaptive behavior scale. The authors of the study concluded that based on a comparison of the experimental and control groups, there is evidence that the TEACCH program is more effective than the treatment the control group received.

Van Bourgondien, Reichle, and Schopler (2003) evaluated the effectiveness of a residential program based on the TEACCH program. The participants consisted of 32 adolescents and adults with autism at the Carolina Living and Learning Center (CLLC). The CLLC is a residential and vocational training program designed and run by Division TEACCH of the University of North Carolina, Chapel Hill. Participants were assigned to their respective groups (control and experimental) based on a part-random, part-clinical assignment procedure. Six participants were placed within the treatment group, and the remaining were in one of three control group conditions: (a) group homes, (b) institutions, or (c) family homes. All participants were given the following battery assessment measures at four time periods in approximately six month periods: (a) Adolescent and Adult Psychoeducational Profile, (b) Autism Behavior Inventory, and (c) the Maladaptive domain of the Vineland Adaptive Behavior Inventory. The results indicated that the participants in the experimental treatment setting, Division TEACCH's CLLC, showed increases in the areas of communication, independence through the use of visual systems, social skills, developmental planning, and positive and preventive behavior management, compared to those in the control groups.

Based on available research, the TEACCH method shows promise of being an evidence-based method. With studies suggesting TEACCH's effectiveness with both

adults and children with autism, as well as its adaptability to both the clinical and educational setting, this intervention technique shows promise of meeting efficacy and clinical utility standards.

Video modeling. Video modeling is a technique that incorporates the use of peers and/or adults to model a desired behavior. Video Self-Modeling (VSM) is a form of video modeling in which the child for whom the video is made is involved in depicting the desired behavior, either through acting or actual modeling. The video of short duration, 5 minutes or less, is presented to the student. After watching the video, staff or teachers may discuss with the student the desired behaviors observed. Video modeling is a method that has been used with students who have difficulty with social interactions, such as those with autism (Graetz, Mastropieri, & Scruggs, 2006).

Buggey (2005) researched the effects the Video Self-Modeling (VSM) on children with autism across a variety of behaviors, including language, social initiations, tantrums, and aggression. Ages of the participants ranged from 5 to 11 years and the severity of autism ranged from mild Asperger's syndrome to moderate autism. Multiple baseline designs across students and behaviors were used to evaluate performance in the various target behavior subsets. The first study addressed social initiations for two boys, 11-years and 9-years-old. Social initiations were defined as unsolicited verbalizations addressed to peers or staff. The role-playing script involved the two boys as well as peers from their school. The participants watched the three-minute video prior to the start of classes for 10 days. An introduction was added to the beginning of the tape and clapping and an overlay of print reading, "Great job, Tommy (Roy)!" was added to the end. Results showed an increase in the frequency of the participants' social initiations.

The second study by Buggey (2005) addressed tantrums exhibited by two boys, six and eight years of age. Both students, along with several peers, were involved in making the video. The video was shown prior to class for 10 days. An introduction was added to the beginning of the tape and clapping was added to the end. Results revealed that rate and duration of tantrums decreased substantially for both participants.

Buggey's (2005) third study focused on pushing and language production behaviors for a 5-year-old boy. The boy was not capable of role-playing appropriate behaviors so he was videotaped in normal activities over three days. From the footage, two and a half minutes were deemed appropriate examples of behavior and were edited together. Narration was added to the beginning of the video ("Here's John playing nicely with his friends. John never pushes.") and again at the end (clapping and "Good job, John!"). The results for pushing behaviors decreased dramatically and immediately and were maintained following the withdrawal of the video. Language production results were not as dramatic or immediate but did show an increase. All five participants in these studies showed significant gains that were maintained after the treatment phase ended.

Charlop-Christy and Daneshvar (2003) conducted a study using video modeling to teach perspective taking to three boys ages six to nine years of age with autism. A multiple-baseline across children and within child across tasks was used to assess learning. Generalization to untrained, similar stimuli was also assessed. A pretest was administered to ensure that they did not already have the ability to answer perspective-taking questions. All three participants failed the pretest, indicating that they did not have the ability of perspective taking. Participants then viewed a video that depicted

familiar adults performing perspective-taking tasks. After watching the video, the experimenter reviewed with the child what had been seen in the video. The video was presented twice and the child was then tested three times on the first perspective-taking task. Participant A passed the posttest and exhibited stimulus generalization to four of the five tasks. Participant B also passed the posttest and during maintenance demonstrated stimulus generalization to all similar stimuli. The last participant failed the posttest and his generalization was inconsistent. For two of these participants, video modeling not only taught perspective-taking behavior but also improved overall responding to memory questions based on the video.

Charlop-Christy, Le, and Freeman (2000) compared the effectiveness of video modeling with in-vivo modeling for teaching developmental skills to children with autism. A multiple baseline design across five children (five to seven years of age) and within child across the two modeling conditions and across tasks were used. Each child was presented two similar tasks; one task was used for the video condition and the other was used for the in-vivo condition. In the video modeling condition, each child watched a video tape of models performing the target behavior. In the in vivo modeling condition, the children observed live models perform the target behavior. After the observations, children were tested for skill acquisition and generalization of target behaviors. Results show that video modeling led to faster acquisition of tasks than did in-vivo modeling and it was more effective in promoting generalization.

Wert and Neisworth (2003) conducted a study testing the effectiveness of using video self-modeling to teach four young children with autism to make spontaneous requests in school settings. A video was made of each child's own spontaneous behavior.

Through editing, only the desired behavior, with no adult prompting, remained on the final tape. Participants were asked to watch their 5-minute video at home one time a day for 5 consecutive school days within 60 minutes prior to school. Results indicated that each participant showed an increase in spontaneous requests, and maintenance data indicated that for three of the four participants, the changes were maintained for a two to six week period. This study also demonstrated generalization of the skill from home to school settings.

MacDonald, Clark, Garrigan, and Vangala (2005) presented a study that used video self-modeling to teach thematic pretend play to two preschool children with autism. A multiple probe design within child across play sets was used to demonstrate experimental control. Children were shown the video two times and no further prompting or reinforcers were given during training. The results indicated that both children acquired the sequences of scripted verbalizations and play actions quickly and maintained performance during the follow-up probes.

Nearly 200 studies on video self-modeling have been reported over the past decade (Hitchcock, Dowrick, & Prater, 2003). Hitchcock et al. (2003) reviewed studies in which video self-modeling was applied in school-based settings. Only eighteen of the studies met requirements for inclusion in their review. Based on their review, the moderate to strong outcomes of the studies suggest that video self-modeling can be used successfully to improve students' communication, behavior, and academic performance in educational settings. When compared to other instructional interventions, video self-modeling showed effects that were immediate, making it time and cost efficient. These studies also showed that initial results from video self-modeling techniques were

maintained and generalized. Only three of the eighteen studies reported difficulties with establishment or maintenance of skills.

Numerous studies have been conducted examining video modeling techniques and of those reviewed within this paper, none have suggested that it is an ineffective method. Therefore, based on the research it seems as though suggestions of effectiveness and clinical utility are prominent enough to support this method as an evidence-based intervention.

Social Stories. Social skills training is particularly important for children with ASD in helping them to overcome many of the disabling deficits in social interactions. Written and oral social skills objectives are often paired with visual cues, such as pictures, photographs, objects and manipulatives (Agosta, Graetz, Mastropieri, & Scruggs, 2004). One frequently cited social skill intervention is Carol Gray's Social Story. Social Stories were first developed by Carol Gray in 1991 (Gray, 2000). They are short stories that define a specific social situation or skill and present the desired behavior (Gray, 2000; Gray & Garand, 1993). Gray (2000) has recommended that Social Stories be used with individuals whose cognitive functioning is at or above the level of a moderate intellectual disability.

Gray (2000) has developed a specific structure and sentence frequency called the *Social Story Ratio* for each Social Story. Each story generally consists of four basic sentences: (a) descriptive, (b) perspective, (c) affirmative, and (d) directive. Descriptive sentences are the only type of sentence required. They are used to address the "wh" questions, such as when something will happen, what is happening, and why and to whom it is happening. Perspective sentences are used to describe a person's internal state

(e.g., opinions, thoughts, knowledge, beliefs), but usually that of others, not the individual with ASD. The directive sentence tells the individual what the desired response or choice is in the given situation. Finally, affirmative sentences refer to commonly shared values or opinions in a given culture. These sentences are used to stress an important point or explain a rule or law, and usually follow a directive, descriptive or perspective sentence. Illustrations, in the form of photographs, clip art or drawings, can be useful for younger children but for some they may limit the generalizability of the situation (Gray, 1994, 2000). Social Stories can be written by parents, teachers, therapists, the individual, or anyone connected to the person for whom the story is being written (Gray, 1994, 2000).

Social Stories are written from the perspective of the individual and are thought to help reduce anxiety through clear and concrete explanations of expectations in social settings (Gray & Garand, 1993). Social Stories can be used for a variety of purposes such as introducing changes in routine or schedule, describing social situations and appropriate responses/expectations, and to generalize academic skills to real life situations (Del Valle, McEachern, & Chambers 2001). A thorough analysis of the research support for Social Stories is the focus of this research project.

Purpose of Current Study

With an increased emphasis in the fields of education and mental health to use evidence-based interventions, analyses of intervention techniques are needed so that education professionals can confidently choose and implement appropriate interventions for children with autism. Although there are recommendations promoting the use of research-based intervention methods, many educators and professionals apparently

continue to use and recommend intervention methods that have not met these standards. Despite the lack of consensus on one definitive set of guidelines for the evaluation of evidence-based or research-based interventions, it is clear from federal laws that educators need to be using research-based interventions.

The prevalence of autism and related spectrum diagnoses have increased greatly in recent years. Having standards of evidence-based methods in all educational avenues, educators and related specialists should implement only those interventions that adhere to those set standards. Although Social Stories have been a common intervention used in facilitating social skills with individuals with autism, the National Research Council (2001) indicated the research support was not established just a few years ago. However, a number of studies on Social Stories have been published in recent years. This project has two purposes. The first purpose is intended to determine whether Social Stories can be considered an evidence-based method. The second purpose is to evaluate carefully numerous variables (e.g., characteristics of participants and implementation aspects) present in Social Stories studies deemed effective and ineffective. This may provide a starting place for educators and interventionists who wish to use Social Stories with a particular student. Those things absent in the reviewed research, which will inevitably be found, will also provide a starting place for future research on the effectiveness of Social Stories.

Method

Sample of Studies

This paper is a review of empirical research literature on Social Stories. Studies selected for this paper were found using on-line databases (EBSCOhost, ERIC, and psychINFO) and the reference sections of all located journal articles were reviewed for additional sources that did not appear in the on-line searches. Journal articles that merely mentioned or discussed Social Stories without empirically evaluating the technique were not included in this review. Unpublished dissertations and theses were also excluded from this review. Articles that were published after Fall of 2007 were also not included, as this was when the search for articles to review ended. Only studies assessing Social Stories were included; those based only on the similar technique of Comic Strip Conversations were excluded. Comic Strip Conversations employ the use of simple drawings and conversation bubbles, rather than a structured story format as used by Social Stories. Eighteen peer-reviewed journal articles were identified that met the criteria and are cited in the Appendix.

Coding the Studies

A descriptive analysis of the data was conducted by evaluating treatment efficacy and clinical utility, as defined by APA (2005). Efficacy is determined by the systematic and scientific evaluation of whether or not an intervention works. The clinical utility pertains to the applicability, feasibility, and usefulness of the intervention. These are important aspects in the consideration of how well an intervention works, for whom it may work best, as well as whether or not it can fit into the definition of research-based.

A summary of each study was prepared addressing the clinical utility and the treatment efficacy. To look at treatment efficacy, the studies were analyzed in a table format that included (a) results, (b) study design, (c) interobserver reliability, (d) procedural reliability, and (e) maintenance and generalization information. To examine clinical utility each study was analyzed in a table format based on participant age, sex, level of cognitive functioning (tests results or narrative description of cognitive abilities), academic abilities (test results or narrative description of academic abilities), diagnosis, Social Stories characteristics (who, where, when, how many, and how often), target behavior, previous interventions, and co-occurring interventions.

The qualifications for Social Stories to be considered a research-based intervention were examined using the guidelines set forth by the No Child Left Behind (NCLB) regulations (U. S. Department of Education, 2007) and APA's (2005) dimensions of treatment efficacy and clinical utility. To do this a third table was made to evaluate the extent to which each study embodies the six characteristics included in the NCLB definition of scientifically based research. The categories in this third table addressed whether or not each study included the following six characteristics: (a) systematic and empirical methods based from observation or experiment, (b) rigorous data analyses that test the hypothesis and support the conclusions, (c) relies upon measurement methods that are reliable across studies by the same or different investigators, (d) uses an empirical research design, (e) is presented in a clear enough manner that the study can be replicated, and (f) has been accepted by a peer-reviewed journal or approved by independent experts who use comparable review methods.

The six characteristics from the NCLB definition were operationally defined as follows. In order to meet the first characteristic concerning systematic and empirical methods, a study must have systematic observations to evaluate the results of the Social Story intervention. The second characteristic, addressing rigorous data analyses, required a quantitative analysis of pre- and post-intervention data. Reliable and valid data across evaluators and observers, the third criteria, was considered to be met if inter-observer reliability and procedural integrity were reported to an agreement level of at least 80%, which was determined to be a reasonable criterion cut-off level (Lidz, 2003). The fourth criteria evaluated the research design. Because of the nature of Social Story studies, no study reviewed met the criteria for an experimental or quasi-experimental design. A study was considered an empirical design if it was able to demonstrate a functional relationship between the intervention and a change in behavior. A study did not meet this criterion, for example, if it used a single subject AB design. For the fifth criteria, the study was deemed clear enough to replicate if 80% of the criteria from the clinical utility chart had been reported (excluding the previous and co-occurring intervention aspects, which were considered unnecessary for replication). All articles identified for this paper were found within peer-reviewed journals so all studies met the final criteria.

In order for a particular Social Story study to be deemed researched-based, it must meet all six characteristics. After all available articles had been analyzed and charted, the results were further analyzed. If the percentage of all identified articles meeting the pre-defined qualifications for being scientifically researched based, as set forth by NCLB, was equal to or greater than 80%, an overall determination would be made that the Social

Story intervention could be considered a research based intervention. Eighty percent or above is recommended as an acceptable classification consistency by Lidz (2003).

To ensure the coding of the studies was objective and accurate, five (27.8%) of the studies were randomly selected and reviewed by a second-year graduate student in psychology to obtain rates of inter-rater agreement. An agreement was recorded when both raters reported the same information for a particular category and it was considered a disagreement when different information was recorded. Inter-rater agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Eighty percent was considered an acceptable level of agreement. Inter-rater agreement was calculated at 80% for the Clinical Utility chart, 96.7% for the Efficacy Chart, and 76.7% for the Evidence-Based Standards chart. The inter-rater agreement for the Evidence-Based Standards chart was considered too low. The disagreements in coding appeared most frequently within the Rigorous Data Analyses column. It was clarified that any study that used a design other than a non-empirical or AB study design would meet this criterion. After the coding rules for that aspect were clarified, inter-rater agreement for the Evidence-Based Standards was completed by the second rater again, resulting in an 86.7% agreement.

Results

Clinical Utility

Clinical utility refers to the applicability, feasibility and usefulness of an intervention (APA, 2005). Numerous descriptive aspects of each study were evaluated to assess clinical utility and are summarized in Tables 1, 2, and 3. All 18 studies reported the number of participants and 16 of the 18 studies reported on the ages of the participants. The other two of the eighteen studies alluded to the participants' ages by mentioning grade level (Rowe, 1999; Smith, 2001). The gender of the participants were reported in 17 of the 18 studies, with Smith (2001) being the only study which did not report on the gender of the participants in that research. A narrative description of cognitive functioning ability or results of cognitive testing were given for 11 of the 18 studies, seven of which gave actual test scores. Thirteen studies reported on academic abilities, two of which gave actual academic test scores (Bledsoe et al., 2003; Norris & Datillo, 1999).

All studies reported the diagnoses of the participants. Twelve studies had at least one participant with a diagnosis of autism, four studies had a participant with a diagnosis of Asperger's Syndrome, and two had participants with a diagnosis of PDD-NOS. Only two studies reported on the severity level of the diagnosis (Lorimer, Simpson, Myles, & Ganz, 2002; Norris & Dattilo, 1999).

All 18 studies reported at least one target behavior to be addressed by the Social Story. Eight studies reported on previous interventions for at least one of the participants and eleven studies reported co-occurring interventions. Sixteen studies indicated the number of Social Stories used in the study. Barry and Burlew (2004) did not indicate the

number of Social Stories used in their study. One study did not indicate in numerical terms how many Social Stories were written but did indicate that a "set" of stories were written (Delano & Snell, 2006). All 18 studies indicated or implied whether or not the Social Stories included pictures or drawings with the written text. Twelve studies included drawings, pictures, media images or photographs, while six did not.

Seventeen of 18 studies indicated who read the Social Story to the child with autism. Thirteen of the studies indicated or implied where the Social Story was initially introduced or implemented. Three of the 18 studies did not report on, or indicate to an extent that it could be inferred, when the Social Story was read. Only eight studies indicated where the Social Story was read and 10 studies indicated or implied how often the story was read.

Based on the results from the analysis of the clinical utility chart, it appears as though most of research provided identifying information about the participants. Severity of diagnosis of the participants and academic abilities were two informational areas that were not consistently identified. Also, details surrounding the implementation of the Social Story were also lacking. Information pertaining to the implementation of the intervention is of particular importance if the study is to be replicated. Such information may also provide insight into why the intervention was or was not successful.

Table 1

Clinical Utility – Part I

Study	Participants	Age	Sex	Cognitive Functioning	Academic Abilities	Diagnosis	Severity of Diagnosis
Adams et al. (2004)	1	7 yrs.	M	NR	NR	Autism	NR
Agosta et al. (2004)	1	6 yrs.	M	Bayley-50, Vineland-64	NR	Autism	NR
Barry & Burlew (2004)	2	a. 7 yrs. b. 8 yrs.	a. F b. M	NR	a. count to 100 & read 100 sight words, b. could do visual matching	a. Autism b. Autism	a. Severe b. Severe
Bledsoe et al. (2003)	1	13 yrs.	M	WISC III-83	WJ-R, Average	Aspergers	NR
Crozier & Tincani (2005)	1	8 yrs.	M	NR	Emerging literacy, able to read with support	Autism	NR
Delano & Snell (2006)	3	a. 6 yrs. b. 6 yrs. c. 9 yrs.	a. M b. M c. M	functional verbal communication	Pre-reading/beginning reading skills	Autism	NR
Gray & Garand (1993)	4	a. 9 yrs. b. 6 yrs. c. 7 yrs. d. high school	a. F b. M c. F d. M	NR	able to read	Autism	NR
Hagiwara & Myles (1999)	3	a. 7 yrs b. 9 yrs c. 7 yrs	a. M b. M c. M	PEP-R, a. 36 months b. 26 months c. 40 months	basic listening or written language skills	Autism	NR

Table 1 *(continued)*

Study	Participants	Age	Sex	Cognitive Functioning	Academic Abilities	Diagnosis	Severity of Diagnosis
Ivey et al. (2004)	3	a. 7 yrs. b. 5 yrs. c. 5 yrs.	a. M b. M c. M	a. NR b. WPPSI-92 c. NR	a. reading grade level b. pre-reading skills c. beginning reading	a. PDD-NOS b. PDD-NOS c. PDD-NOS	NR
Kuoch & Mirenda (2003)	3	a. 3 yrs. b. 5 yrs. c. 6 yrs.	a. M b. M c. M	PPVT-R, a. 95 b. 44 c. 107	"an interest in books"	a. Autism b. NR c. PDD-NOS	NR
Kuttler et al. (2003)	1	12 yrs.	M	CAS-60 months	NR	Autism, Fragile X, & intermittent explosive disorder	NR
Lorimer et al. (2002)	1	5 yrs.	M	estimated average to above	hyperlexia, splinter math skills	Autism	mild to moderate
Norris & Dattilo (1999)	1	8 yrs.	F	average	Iowa Test of Basic Skills, 2nd grade level	Autism	mild to moderate
Rogers & Myles (2001)	1	14 yrs.	M	NR	NR	Aspergers	NR
Rowe (1999)	1	"year 2 pupil"	M	NR	NR	Aspergers	NR
Sansosti & Powell-Smith (2006)	3	a. 10 yrs. b. 11 yrs c. 9 yrs	a. M b. M c. M	average to above average	a. above grade level b. high academic skills c. NR	a. Aspergers b. Aspergers c. Aspergers	NR

Table 1 *(continued)*

Study	Participants	Age	Sex	Cognitive Functioning	Academic Abilities	Diagnosis	Severity of Diagnosis
Scattone et al. (2002)	3	a. 7 yrs. b. 15 yrs. c. 7 yrs.	a. M b. M c. M	a. SBIV-44 b. KABC-82 c. KABC-67	a. could read b. could read c. could not read	a. Autism b. Autism c. Autism	NR
Smith (2001)	19	In Key Stages 1, 2, 3 of school	NR	NR	ranging from those that could read to those that could not read	15-ASD 2-LD 1-Tourettes Syndrome 1- Semantic pragmatic difficulties	NR

Note. NR = Not Reported; PDD-NOS = Pervasive Developmental Disorder – Not Otherwise Specified; ASD = Autism Spectrum Disorder; LD = Learning Disabled.

Table 2

Clinical Utility – Part II

Study	Target Behavior	Previous Intervention	Co-occurring Intervention	# of Social Stories	Pictures Included
Adams et al. (2004)	crying, falling, hitting & screaming	NR	NR	1	no
Agosta et al. (2004)	screaming, yelling crying & humming	NR	tangible rewards in phase 1	2	yes, icons
Barry & Burlew (2004)	choice making & appropriate free play	picture schedules & menus, direct instruction	picture schedules & menus	3, same for both	yes, photos
Bledsoe et al. (2003)	lunchroom manners	NR	NR	1	yes, photos
Crozier & Tincani (2005)	talking out	NR	verbal prompts in phase C	1	yes, line drawing
Delano & Snell (2006)	social engagement seeking attention requests & contingent responses	a. & c. discrete trial training	a & c. discrete trial training b. behavior contract midway	a "set" of stories was written for each student	a. & c. yes, b. no
Gray & Garand (1993)	a. hitting scratching, kicking, taking off seatbelt, b. morning routine, c. self-abusive behaviors, d. voice control	a. NR, b. picture schedules & verbal prompting, c. positive reinforcers, d. reminders	a. verbal prompts b. NR, c. verbal cuing to read story d. minimal reminders	1 each	no
Hagiwara & Myles (1999)	a. & b. washing hands, c. on task behavior	NR	NR	3 each	yes, multimedia

Table 2 *(continued)*

Study	Target Behavior	Previous Intervention	Co-occurring Intervention	# of Social Stories	Pictures included
Ivey et al. (2004)	novel events	NR	NR	16, same for all	yes, photos & line drawings
Kuoch & Mirenda (2003)	a. aggression, crying, & yelling, b. eating, c. problems playing with peers	a. discrete trial training b. & c. discrete trial training & Social Stories	discrete trial training	1 each	yes, clip art
Kuttler et al. (2002)	precursors to tantrum behaviors	NR	picture schedule, sticker chart prompting, communication book w/icons, speech, music therapy, adaptive P.E., art therapy, horticulture therapy, medication	2	yes, picture icons
Lorimer et al. (2002)	tantrums	timer, mini schedule	medication, speech, occupational therapy; unclear if previous interventions were stopped	2	yes, line drawing
Norris & Dattilo (1999)	social interaction at lunch	NR	NR	3	yes, picture symbols
Rogers & Myles (2001)	problem during & after lunch	verbal and physical prompts	Comic Strip Conversations, redirecting	2	no
Rowe (1999)	refusing to enter the lunchroom & eat with others	explaining how and why to behave	NR	1	no
Sansosti & Powell-Smith (2006)	a. sportsmanship b. conversation w/ peers c. joining in w/ peers	no interventions for at least a year	NR	1 each	no

Table 2 *(continued)*

Study	Target Behavior	Previous Intervention	Co-occurring Intervention	# of Social Stories	Pictures included
Scattone et al. (2002)	a. tipping chair b. disruptive behavior c. shouting during class	NR	a. verbal prompts, b. intervention for off-task behavior, c. NR	1 each	no
Smith (2001)	behavior compliance with social conventions, self-help skills, friendship behaviors, transitions, sexual behaviors	NR	NR	1 each	no

Note. NR = Not Reported.

Table 3

Clinical Utility – Part III

Study	Who Implemented	Where Initially Implemented	When Read	Where Read	How Often Read
Adams et al. (2004)	parents	NR	NR	home	NR
Agosta et al. (2004)	teacher	assumed to be in classroom	before & during circle time	in classroom	daily during the school week and as needed
Barry & Burlew (2004)	teacher's aide	assumed to be in classroom	in the mornings	in the classroom	daily, as needed
Bledsoe et al. (2003)	researcher	assumed to be in classroom	prior to lunch	at school	daily, upon request and by teacher suggestion
Crozier & Tincani (2005)	researcher	assumed to be in a separate classroom	immediately before observation	in preschool classroom	NR
Delano & Snell (2006)	researcher	a. & b. resource room c. area between classroom	NR	a. & b. play area of resource room, c. table between rooms	NR
Gray & Garand (1993)	a. mother, b. assumed to be teacher, c. & d. teacher	a. NR (unclear), b. & c. classroom, d. special education classroom	a. before & after picking up brother, b. before morning routine, c. NR, d. prior to music class	NR	NR
Hagiwara & Myles (1999)	teacher, aide, researcher	NR	prior to entry into 1 of 3 environments	NR	daily
Ivey et al. (2004)	parents & researcher	home	5 days prior to novel event and prior to speech therapy	NR	once daily

Table 3 *(continued)*

Study	Who Implemented	Where Initially Implemented	When Read	Where Read	How Often Read
Kuoch & Mirenda (2003)	a. mother, b. staff at preschool, c. 3 early childhood interventionists	NR	prior to situation in which target behavior would typically occur	NR	NR
Kuttler et al. (2002)	classroom staff	NR	immediately prior to work or lunch	NR	each school day, as requested by student
Lorimer et al (2002)	parents & therapist	assumed to be in basement of home	each morning, beginning of therapy, prior to adult conversation in his presence	at school & home	available all the time, read once a day or twice a day on alternate weekends
Norris & Dattilo (1999)	participant read	outside of classroom	15 minutes prior to lunch	outside of classroom	1 of 3 read daily, available at all times in classroom
Rogers & Myles (2001)	student read	NR	before lunch	NR	daily
Rowe (1999)	NR, "was read"	NR	before lunch	NR	NR
Sansosti & Powell-Smith (2006)	child and primary caregiver	assumed to be at home	before going & returning home from school	NR	assumed to be twice daily on school days
Scattone et al. (2002)	a. & b. participant read c. teacher	classroom	a. & c. before morning class, b. one hour before recess	NR	a. daily before class, b. assumed daily, c. each school day
Smith (2001)	family & teachers	assumed to be in classroom	NR	NR	NR

Note. NR = Not Reported.

Treatment Efficacy

Treatment efficacy refers to the systematic and scientific evaluation of whether or not the intervention was effective. Six characteristics of each study were examined to assess treatment efficacy and are listed in Table 4. Although each study described its research methodology, only 13 used systematic observational methods. The other four studies used non-empirical observation methods (i.e., qualitative reports of behavioral changes) to evaluate the results of the intervention. All studies reported results, either with quantitative or qualitative descriptions, with positive results reported for all 18 studies. Thirteen of the studies calculated and reported interobserver reliability and only 10 reported procedural integrity. Maintenance information was calculated, informally reported, or implied for five of the studies (i.e., Crozier & Tincani, 2005; Gray & Garand, 1993; Kuoch & Mirenda, 2003; Rowe, 1999; Sansosti & Powell-Smith, 2006). Generalization information was reported on, or implied, in six studies (i.e., Adams et al., 2004; Gray & Garand, 1993; Delano & Snell, 2006; Hagiwara & Myles, 1999; Kuoch & Mirenda, 2003; Rowe, 1999).

The most surprising result from the analysis of this table was the number of studies that used non-empirical or simple AB study designs. Without more stringent methods of data collection, the results of the studies are not well supported. There were also very few studies that collected information on maintenance and generalization information.

Table 4

Treatment Efficacy

Study	Study Design	Results	Interobserver Reliability	Procedural Reliability	Maintenance	Generalization
Adams et al. (2004)	ABAB	decrease in target behaviors	1/3 of sample, mean agreement 90%	NR	NR	behaviors targeted at home decreased at school
Agosta et al. (2004)	ABCA	decrease in screaming, increase in time sitting quietly	NR	NR	NR	NR
Barry & Burlew (2004)	multiple baseline ABCD	both showed gains in target behaviors	1/3 of sample, mean agreement: choice making 100%, appropriate play 97%	NR	NR	NR
Bledsoe et al. (2003)	ABAB	reduction in food spilling & increase in wiping	1/4 of sessions, mean agreement 100%	NR	NR	NR
Crozier & Tincani (2005)	ABAC reversal	talking out decreased	1/4 of sessions, mean agreement 100%	25% of sessions at 100%	2 weeks later, levels remained	NR
Delano & Snell (2006)	multiple probes across participants	increase in duration of time spent socially & target social behaviors	1/3 of sample, mean agreement: a. 33%, b. 88%, c. 81%	mean across all participants was 93%	NR	a. & b. showed gains in classroom, c. showed gains with a novel peer in intervention setting
Gray & Garand (1993)	NR	a. showed behaviors the first day, b. effective, c. prevented self-abusive behaviors and aggression	NR	NR	NR	a. "seemed to maintain," b. "the problem was corrected," c. prevented future behaviors

Table 4 *(continued)*

Study	Study Design	Results	Interobserver Reliability	Procedural Reliability	Maintenance	Generalization
Hagiwara & Myles (1999)	multiple baselines	a. improved, b. improved, c. partially improved	1/3 of sessions: a. 100% agreement, b. 100% agreement, c. 89% agreement	NR	NR	a. demonstrated obvious generalizations
Ivey et al. (2004)	ABAB	all 3 increased in target skills	mean agreement across all phases 89%	NR	NR	NR
Kouch & Mirenda (2003)	ABA ACBA	all showed reduction in problem behaviors	1/4 of sessions, 98% across all participants	98% across participants	a. maintained for 4 weeks, b. 2 weeks. c. 4 weeks	a. generalization of sharing, c. mom reported behaviors generalized at home
Kuttler et al. (2002)	ABAB	effective in reducing behaviors	1/3 of observations, 93% agreement	NR	NR	NR
Lorimer et al. (2002)	ABAB	reduced precursor tantrum behaviors & increased effectiveness of other interventions	1/3 of observations, 96% agreement	NR	NR	NR
Norris & Dattilo (1999)	AB	decrease in inappropriate social interactions no effect on appropriate social interactions	1/5 of baseline sessions, 89-100% agreement; 1/4 of intervention, 88-100% agreement	1/5 of sessions, 100% for each story	NR	NR
Rogers & Myles (2001)	NR	redirections decreased & he was no longer tardy after lunch	NR	NR	NR	NR

Table 4 *(continued)*

Study	Study Design	Results	Interobserver Reliability	Procedural Reliability	Maintenance	Generalization
Rowe (1999)	NR	child reportedly had a "happy lunch time" & ate all of his lunch	NR	NR	story was discontinued & appropriate behaviors continued	transferred skills to other situations
Sansosti & Powell-Smith (2006)	multiple baseline across participants	a & b demonstrated performance similar to peers c. not effective	1/5 of baseline & 1/4 of intervention, agreement above 80%	a. 88%, b. 92%, c. could not be determined	no clear evidence skills were maintained	NR
Scattone et al. (2002)	multiple baseline across participants	behavior reduction in all participants	1/3 of observations a & b 100% c. 93%	a. & c. 100% b. 91%	NR	NR
Smith (2001)	NR	parent & teacher report on 10-point Likert scale ranged from 6 to 7	NR	NR	NR	NR

Note. NR = Not Reported.

Evidence-Based Standards

Table 5 addresses the six criteria, as set forth by NCLB, for evidence-based research. Seventeen studies meet the first criterion (systematic observations to evaluate the results). The second criterion ("study involves rigorous data analyses that are adequate to test the stated hypotheses and justify the general conclusions drawn") was met by 13 of the studies. Seven of the studies met the criteria for using reliable measurements methods. Five of the 18 studies did not meet the criterion for empirical research designs; no study met the experimental or quasi-experimental design portion of the criteria. Ten studies reported on clinical utility information to the extent that the studies were deemed clear enough to replicate, the fifth criteria. It was determined that a study was clear enough to replicate if 80% of the criteria from the clinical utility chart had been reported, with the exception of the previous and co-occurring interventions. All studies meet the final criteria of being peer-reviewed or reviewed by professional by comparable methods.

Based on the findings gathered from the analysis of the studies, two (Gray & Garand, 1993; Rowe, 2001) of the 18 studies did not meet the first criteria, the use of systematic data collection methods. The two studies that did not meet this criterion reported only anecdotal results. Five of the 18 studies did not used rigorous data analyses that tested and supported the hypothesis and conclusions. Seven on the studies contained reliable and valid data across evaluators and observers. Thirteen studies systematic observation methods. Eight studies were determined not to be clear enough to replicate. All 18 studies were peer-reviewed.

Only three of the 18 studies, or 16.7%, meet all six of the NCLB criteria for evidence-based research. Because the percent of the studies reviewed which met all six qualifications did not reach the a priori criteria of 80%, Social Stories have not yet met the criteria for an evidence-based intervention for children with ASD. Those studies that did not meet all six criteria seemed to share in common, the lack or interobserver reliability and procedural integrity data. Because these data were not reported, the study would not meet the criteria of reliable measurement methods. Another category that was often not met by studies was the category that addressed whether the study was clear enough to replicate. Presumably, it was the various pieces of missing information from the clinical utility chart that affected many of the studies in this criterion area.

Table 5

Evidence-Based Standards

Study	Observations to Evaluate Results?	Rigorous Data Analysis?	Reliable Data Across Observers?	Empirical Design?	Clear Enough to Replicate?	Peer-Reviewed?
Adams et al. (2004)	Yes	Yes	Yes	Yes	No	Yes
Agosta et al. (2004)	Yes	Yes	No	Yes	Yes	Yes
Barry & Burlew (2004)	Yes	Yes	No	Yes	Yes	Yes
Bledsoe et al. (2003)	Yes	Yes	No	Yes	Yes	Yes
Crozier & Tincani (2005)	Yes	Yes	Yes	Yes	Yes	Yes
Delano & Snell (2006)	Yes	Yes	Yes	Yes	No	Yes
Gray & Garand (1993)	No	No	No	No	No	Yes
Hagiwara & Myles (1999)	Yes	Yes	No	Yes	Yes	Yes
Ivey et al. (2004)	Yes	Yes	No	Yes	Yes	Yes
Kouch & Mirenda (2003)	Yes	Yes	Yes	Yes	No	Yes

Table 5 *(continued)*

Study	Observations to Evaluate Results?	Rigorous Data Analysis?	Reliable Data Across Observers?	Empirical Design?	Clear Enough to Replicate?	Peer-Reviewed?
Kuttler et al. (2002)	Yes	Yes	No	Yes	No	Yes
Lorimer et al. (2002)	Yes	Yes	No	Yes	Yes	Yes
Norris & Dattilo (1999)	Yes	No	Yes	No	Yes	Yes
Rogers & Myles (2001)	Yes	No	No	No	No	Yes
Sansosti & Powell-Smith (2006)	Yes	Yes	Yes	Yes	Yes	Yes
Scattone et al. (2002)	Yes	Yes	Yes	Yes	Yes	Yes
Smith (2001)	Yes	No	No	No	No	Yes

Discussion

The intention of this paper was to review the existing peer-reviewed literature using Social Stories as an intervention method with children with autism and related spectrum disorders. The studies were analyzed to determine whether Social Stories met the criteria for an evidence-based intervention as determined by the NCLB standards. Based on the findings gathered from the analysis of the studies, three of the 18 studies, or 16.7%, meet all six of the NCLB criteria for evidence-based research. Because the percent of the studies reviewed which met all six qualifications did not reach the a priori 80% criterion, Social Stories cannot yet be considered an evidence-based intervention for children with autism. Such a conclusion is consistent with a review of Social Story research by Sansosti, Powell-Smith, and Kincaid (2004). Although they only evaluated the effectiveness of Social Stories as an intervention based on empirical foundations, the results from their research were similar to the results of this analysis. That is, although there seems to be a number of studies that describe the positive effects of Social Stories, the empirical foundation for support of its effectiveness is limited. Sansosti et al. (2004) also state that it may be premature to suggest Social Stories as an evidence-based intervention to use with individuals with ASD.

The three studies that met all six criteria for evidence-based research (Crozier & Tincani, 2005; Sansosti et al., 2004; Scattone et al., 2002) only shared one common variable-all the participants were male. Ages of the participants ranged from eight-years old to 15-years old. Cognitive level varied from a narrative description of average to above average abilities to formal intelligence quotient test scores within the Well Below Average range. Participants' academic abilities varied among those three studies,

from those that could read to those that were unable to read. Implementation of the Social Story intervention also varied across the three studies, ranging from the participant reading the story himself to the story being read by the classroom teacher, parent or researcher. Only one of the three studies used pictures within the Social Story book. Among these three studies, there did not appear to be any common variables that would account for the success of the Social Stories.

A general criticism of the studies reviewed for this paper is the lack of descriptive information given about the characteristics of the participants. Clear descriptions of the participant characteristics are particularly important in single subject designs, which is the common research methodology used in Social Stories research. Single subject designs are criticized because of their low external validity, and without specific detailed information about participant characteristics, the ability to understand for whom Social Stories are most effective is diminished. Gray and Garand (1993) suggested Social Stories were most likely to be successful with individuals who have at least moderate intellectual functioning abilities or who possess higher basic language skills. Therefore, studies should indicate participants' level of cognitive and communicative functioning. While all studies reviewed indicated a diagnosis, only two indicated a level of severity for that diagnosis, which, like cognitive and communicative functioning, may be an important variable in the efficacy of Social Stories. It was also surprising the number of studies that did not report details about the implementation of the Social Story, such as when, where and how often it was read. These variations may be important in the efficacy of the intervention and would also be important in replicating the studies.

Interobserver agreement and procedural integrity measurements were areas that seemed to be neglected in many of the studies. Although Social Stories are a relatively simple intervention to implement, intervention integrity measures and interobserver agreement are still important aspects of good research design. As such, generalization and maintenance data are also important areas for Social Stories research to address. As generalization and maintenance of skills are two areas that have been noted to be areas of difficulty for individuals with autism, it may be of particular importance whether or not an intervention shows promise of skill generalization and maintenance.

The final general criticism of the research is the overall lack of quantitative evidence of results. Many studies would simply indicate that the problem behavior had decreased or that gains had been made. It seems necessary for quantitative information to be given about the decrease in problematic behaviors or the increase in pro-social behaviors, especially if the research should be considered solid and within good research design standards.

Limitations

The first limitation of this project is that the review of each Social Story study was conducted through subjective evaluation. Inter-rater agreement on the ratings was established at acceptable rates although rating criteria had to be refined for some categories to establish those rates. It is also reasonable to suspect that there may be other published Social Story studies that were not located. It should also be acknowledged that the criteria needed to meet the standards of an evidence-based intervention may be interpreted in an extreme sense, in part due to the ambiguous nature of the language. The ambiguity of the six qualifications set forth by NCLB made it particularly difficult to

determine how the research studies should be assessed using those qualifications. With such strict guidelines to follow for evidence-based research and interventions, it would seem extremely difficult to find studies and/or interventions that meet these high standards. A final limitation of this project was related to the 80% criteria of studies meeting all six evidence-based standards. Such a criteria was arbitrarily set and may have been too strict.

Future Research

Future research on Social Stories should address all the categories given in the Clinical Utility and Treatment Efficacy tables, so that more evidence can be provided in meeting the six qualifications of an evidence-based intervention. More rigorous research designs should be used in future research so that any positive results have a strong empirical foundation on which to stand. Should future Social Story research produce more studies that meet the criteria for evidence-based research, Social Stories should be re-examined as to whether or not the existing literature provides substantial evidence that it is an evidence-based intervention. Future research may also want to examine more closely the Social Story components, to determine which are more critical than others. Finally, future research may also want to examine the maintenance and generalization of the effects of a Social Story. There seems to be evidence, from both formal research studies and informal observations of educational practices, that Social Stories are an effective intervention for some individuals with autism. However, it seems as though vacancies in the research need to be filled before it can conclusively be decided that Social Stories meets the criteria for an evidence-based intervention.

References

Agosta, E., Graetz, J. E., Mastropieri, M. A., & Scruggs, T. E. (2004). Teacher-researcher partnerships to improve social behavior through social stories. *Intervention in School and Clinic*, *39*(5), 276-287.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (text revision). Washington, D.C.

American Psychological Association. (2005). *Report of the 2005 presidential task force on evidence-based practice.* Retrieved February 28, 2007, from http://www.apa.org

Baranek, G. T. (2002). Efficacy of sensory motor interventions for children with autism. *Journal of Autism and Developmental Disorder, 32*(5), 397-422.

Bondy, A. S., & Frost, L. A. (1994). The Picture Exchange Communication System. *Focus on Autistic Behavior*, *9*(3), 1-19.

Buggey, T. (2005). Video self-modeling applications with students with autism spectrum disorder in a small private school setting. *Focus on Autism and Other Developmental Disabilities, 20*(1), 52-63.

Center for Disease Control and Prevention. (2007). *Autism spectrum disorders overview*. Retrieved August 15, 2007, from http://www.cdc.gov/ncbddd/autism

Center for the Study of Autism. (2007). Music therapy and language for the autistic child. Retrieved July 30, 2007, from http://www.autism.org/music.html

Charlop-Christy, M. H., Carpenter, M., Le, L., LeBlanc, L. A., & Kellet, K. (2002). Using the Picture Exchange System (PECS) with children with autism: Assessment of PECS acquisition, speech, social-communicative behavior, and problem behavior. *Journal of Applied Behavior Analysis*, *35*, 213-231.

Charlop-Christy, M. H., & Daneshvar. S. (2003). Using video modeling to teach perspective taking to children with autism. *Journal of Positive Behavior Interventions*, *5*(1), 12-21.

Charlop-Christy, M. H., Le, L., & Freeman, K. A. (2000). A comparison of video modeling with in vivo modeling for teaching children with autism. *Journal of Autism and Developmental Disorders*. *30*(6), 537-552.

Crozier, S., & Sileo, N. (2005). Encouraging positive behavior with social stories. *Teaching Exceptional Children,* 37(6), 26-31.

Dawson, G., & Watling, R. (2000). Interventions to facilitate auditory, visual, and motor integration in autism: A review of the evidence. *Journal of Autism and Developmental Disorders, 30*(5), 415-421.

Delprato, D. J. (2001). Comparisons of discrete-trial and normalized behavioral language interventions for young children with autism. *Journal of Autism and Developmental Disorders*, *31*(3), 315-325.

Del Valle, P., McEachern, A., & Chambers, H., (2001). Using social stories with autistic children. *Journal of Poetry Therapy*, 14(4), 187-197.

Dempsey I., & Foreman, P. (2001). A review of educational approaches for individuals with autism. *International Journal of Disability, Development and Education, 48*(1), 103-116.

Din, F. S., & McLaughlin, D. (2000, February). *Teach children with autism the discrete trial approach.* Paper presented at the Annual Conference of Eastern Research Association, Clearwater, FL.

Division TEACCH (2006). Retrieved September 26, 2007 from http://www.teacch.com

Duffy, B., & Fuller, R. (2000). Role of music therapy in social skills development in children with moderate intellectual disability. *Journal of Applied Research in Intellectual Disabilities*, *13*, 77-89.

Edelson, S. M. (1997). *Social behavior in autism*. Retrieved March 7, 2006, from http://www.autism.org/social.html

Ganz, J. B., & Simpson, R. L. (2004). Effects of communicative requesting and speech development of the picture exchange communication system in children with characteristics of autism. *Journal of Autism and Developmental Disorders*, *34*(4), 395-409.

Graetz, J. E., Mastropieri, M. A., & Scruggs, T. E. (2006). Show time: Using video self-modeling to decrease inappropriate behavior. *Teaching Exceptional Children*, *38*, 43-48.

Gray, C. (2000). *The new social story book: Illustrated edition.* (Rev. ed.). Arlington, TX: Future Horizons.

Gray, C. A., & Garand, J. D. (1993). Social stories: Improving responses of students with autism with accurate social information. *Focus on Autistic Behavior*, *8*(1), 1-10.

Gutkin, T. B. (2002). Evidence-based research interventions in school psychology: State of the art and directions for future research. *School Psychology Quarterly, 17*(4), 339-340.

Hitchcock, C. H., Dowrick, P. W., & Prater, M. A. (2003). Video self-modeling intervention in school-based settings: A review. *Remedial and Special Education, 24*(1), 36-45.

Hoagwood, K., & Johnson, J. (2003). School psychology: A public health framework I. From evidence-based practices to evidence-based policies. *Journal of School Psychology, 41*, 3-21.

Kratochwill, T. R., & Shernoff, E. S. (2004). Evidence-based practice: Promoting evidence-based intervention in school psychology. *School Psychology Review, 33*(1), 34-48.

Kravits, T. R., Kamps, D. M., Kemmerer, K., & Potucek, J. (2002). Brief report: Increasing communication skills for an elementary-aged student with autism using the Picture Exchange Communication System. *Journal of Autism and Developmental Disorders, 32*(3), 225-230.

Lidz, C. S. (2003). *Early childhood assessment*. Hoboken, NJ: John Wiley & Sons, Inc.

Lovaas, O. I. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology, 55*(1), 3-9.

MacDonald, R., Clark, M., Garrigan, E., & Vangala, M. (2005). Using video modeling to teach pretend play to children with autism. *Behavioral Interventions, 20*, 225-238.

Mesibov, G. B. (2006). *TEACCH autism program*. Retrieved February 28, 2007, from http://www.teach.com/whatis.html

National Autistic Society (2007). Retrieved September 26, 2007, from http://www.nas.org.uk/

National Research Council. (2001). *Educating children with autism.* Washington, DC: National Academy Press.

Panerai, S., Ferrante, L., & Zingale, M. (2002). Benefits of the treatment and education of autistic and communication handicapped children (TEACCH) programme as compared with a non-specific approach. *Journal of Intellectual Disability Research, 46*(4), 318-327.

Ramirez, J. (1998). *Sensory integration and its effects on young children.* Lehman College. (ERIC Document Reproduction Service No. ED346082)

Rogers, S. J. (2000). Interventions that facilitate socialization in children with autism. *Journal of Autism and Developmental Disorders, 30*(5), 399-409.

Sansosti, F. J., Powell-Smith, K. A., & Kincaid, D. (2004). A research synthesis of social story interventions for children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, *19*(4), 194-204.

Schwartz, I. S., & Garfinkle, A. N. (1998). The Picture Exchange Communication System: Communicative outcomes for young children with disabilities. *Topics in Early Childhood Special Education*, *18*(3), 144- 159.

Smith, T. (2001). Discrete trial training in the treatment of autism. *Focus on Autism and Other Developmental Disabilities*, *16*(2), 86-92.

Tsang, S. K. M., Shek, D. T. L., Lam, L. L., Tang, F. L. Y., & Cheung, P. M. P. (2007). Brief report: Application of the TEACCH program on Chinese pre-school children with autism-Does culture make a difference? *Journal of Autism and Developmental Disorders, 37*, 390-396.

Tutt, R., Powell, S., & Thorton, M. (2006). Educational approaches in autism: What we know about what we do. *Educational Psychology in Practice*, *22*(1), 69-81.

United States Department of Education. (2006). Assistance to states for the education of children with disabilities and preschool grants for children with disabilities; Final rule, 71 Fed. Reg. (August 14, 2006) (codified at 34 C.F.R. §§ 300-301).

United States Department of Education. (2007). *IDEA regulations: Alignment with the No Child Left Behind (NCLB) Act*. Retrieved July 30, 2007, from http://idea.ed.gov/explore/view/p/,root.dynamic,topicalbrief,3,

Van Bourgondien, M. E., Reichle, N. C., & Schopler, E. (2003). Effects of a model treatment approach on adults with autism. *Journal of Autism and Developmental Disorders, 33*(2), 131-140.

What Works Clearinghouse. (2006). *Evidence standards for reviewing studies*. Retrieved February 28, 2007, from http://www.whatworks.ed.gov

Weiss, M. J. (2005). Comprehensive ABA programs: Integrating and evaluating the implementation of varied instructional approaches. *The Behavior Analyst Today*, *6*(4), 249-256.

Wert, B. Y., & Neisworth, J. T. (2003). Effects of video self-modeling on spontaneous requesting in children with autism. *Journal of Positive Behavior Interventions, 5*(1), 30-34.

Wimpory, D., Chadwick, P., & Nash, S. (1995). Brief report: Musical interaction therapy for children with autism: An evaluative case study with two-year follow-up. *Journal of Autism and Developmental Disorders, 25*(5), 541-552.

Yoder, P., & Stone, W. L. (2006). A randomized comparison of the effect of two prelinguistic communication interventions on the acquisition of spoken communication in preschoolers with ASDS. *Journal of Speech, Language, and Hearing Research, 49*, 698-711.

Appendix

List of Social Stories Research Articles Evaluated

Adams, L., Gouvousis, A., VanLue, M., & Waldron, C. (2004). Social story intervention: Improving communication skills in a child with an autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities*, *19*(2), 87-94.

Agosta, E., Graetz, J. E., Mastropieri, M. A., & Scruggs, T. E. (2004). Teacher-researcher partnerships to improve social behavior through social stories. *Intervention in School and Clinic*, *39*(5), 276-287.

Barry, L. M., & Burlew, S. B. (2004). Using social stories to teach choice and play skills to children with autism. *Focus on Autism and Other Developmental Disabilities*, *19*(1), 45-51.

Bledsoe, R., Myles, B. S., & Simpson, R. L. (2003). Use of a social story intervention to improve mealtime skills of an adolescent with Asperger syndrome. *SAGE Publications and the National Autistic Society*, *7*(3), 289-295.

Crozier, S., & Tincani, M. J. (2005). Using a modified social story to decrease disruptive behavior of a child with autism. *Focus on Autism and Other Developmental Disorders, 20*(3), 150-157.

Delano, M., & Snell, M. E. (2006). The effects of social stories on the social engagement of children with autism. *Journal of Positive Behavior Interventions, 8*(1), 29-42.

Gray, C. A., & Garand, J. D. (1993). Social stories: Improving responses of students with autism with accurate social information. *Focus on Autistic Behavior*, *8*(1), 1-10.

Hagiwara, T., & Myles, B. S. (1999). A multimedia social story intervention: Teaching skills to children with autism. *Focus on Autism and Other Developmental Disabilities*, *14*(2), 82-95.

Ivey, M. L., Heflin, L. J., & Alberto, P. (2004). The use of social stories to promote independent behaviors in novel events for children with PDD-NOS. *Focus on Autism and Other Developmental Disabilities*, *19*(3), 164-176.

Kuoch, H., & Mirenda, P. (2003). Social story interventions for young children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, *18*(4), 219-227.

Kuttler, S., Myles, B. S., & Carlson, J. K. (1998). The use of social stories to reduce precursors to tantrum behavior in a student with autism. *Focus on Autism and Other Developmental Disabilities, 13*(3), 176-182.

Lorimer, P. A., Simpson, R. L., Myles, B. S., & Ganz, J. B. (2002). The use of social stories as a preventative behavioral intervention in a home setting with a child with autism. *Journal of Positive Behavior Interventions, 4*(1), 53-60.

Norris, C., & Dattilo, J. (1999). Evaluating effects of a social story intervention on a young girl with autism. *Focus on Autism and Other Developmental Disabilities, 14*(3), 180-186.

Rogers, M. F., & Myles, B. S. (2001). Using social stories and comic strip conversations to interpret social situations for an adolescent with Asperger syndrome. *Intervention in School and Clinic*, *38*(5), 310-313.

Rowe, C. (1999). Do social stories benefit children with autism in mainstream primary schools? *British Journal of Special Education, 26*(1), 12-14.

Sansosti, F. J., & Powell-Smith, K. A. (2006). Using social stories to improve the social behavior of children with Asperger syndrome. *Journal of Positive Behavior Interventions, 8*, 43-57.

Scattone, D., Wilczynski, S. M., Edwards, R. P., & Rabian, B. (2002). Decreasing disruptive behaviors for children with autism using social stories. *Journal of Autism and Developmental Disorders*, *32*(6), 535-543.

Smith, C. (2001). Using social stories to enhance behaviour in children with autistic spectrum difficulties. *Educational Psychology in Practice*, *17*(4), 337-345.